



## SAN BERNARDINO MICROWAVE SOCIETY, Incorporated

FOUNDED IN 1968

A NONPROFIT AMATEUR TECHNICAL ORGANIZATION DEDICATED  
TO THE ADVANCEMENT OF COMMUNICATIONS ABOVE 1000 MC.

# W6IFE Newsletter

## April 2005 Edition

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At the **7 April** meeting Paul Chominski WA6PY on EME personal history and current projects. Paul's story is interesting and he has a lot of experience on 10GHz and 23cm EME, as well as building high power amplifiers. We will have nominations and elections of the SBMS 2005-06 officers. Folks are to bring something to the third auction off during the meeting for the benefit of the Auxiliary Fund, which is to provide extra monies to the treasury for MUD05 expenses. Here are three categories of sales:

1. Whatever it brings, give it to the club.
2. Starting bid needs to be met or it goes back to the owner. If it goes over that, it all goes to the club.

3. Starting bid needs to be met, the club gets a percentage of the final bid.

Put a tag on the items so that I know which category they fit in.

The SBMS meets at the American Legion Hall 1024 Main Street (south of the 91 freeway) in Corona, CA at 1900 hours local time on the first Thursday of each month. Check out the SBMS web site at <http://www.ham-radio.com/sbms/>.

**Last meeting:** Chip, N6CA talked about ways to improve the resistance of the tripod mount to winds blowing it over. Dick, K6HIJ talked about the Idea IF radio. Thanks to both for good information. Nominations from the floor for the 2005 SBMS officers were made. Chris, N9RIN President; Doug, K6JEY VP; Mel, WA6JEY secretary; Dick, K6HIJ treasurer; Kurt K6RRA corresponding secretary; Bill, WA6QYR newsletter editor. Visitors Scott KC6MMF of Orange and Ken K6HK also of Orange were present. Mike, W6YLZ and Frank, W6QI were presented awards for high scores in the ARRL 10 GHz and Up contest. 28 people present.

### **Scheduling.**

30 April & 7 May SBMS 2 GHZ and Up contest see [www.ham-radio.com/sbsm/club contest/2GHz up test 2005.pdf](http://www.ham-radio.com/sbsm/club%20contest/2GHz%20up%20test%202005.pdf).

11-13 June ARRL June VHF QSO Party

25-26 June ARRL Field Day

6-7 August ARRL UHF Contest

20-21 August ARRL 10 GHz and Up contest

10-12 September ARRL September VHF QSO Party

17-18 September ARRL 10 GHz and Up contest

For more details see later page by Not yet elected but running already "Square Deal Doug"

**Activity reported** at the March SBMS: Chris, N9RIN went to a SDMG meeting and worked with some Hittite items and 4x multipliers; Mel, WA6JBD worked with some NEC synthesizers in the 1600-2400 MHz range; Chuck, WA6EXV works N6RMJ, WB6CWN and N6CA from Red Rock State Park and has been working on OVRO drawings; Bill WA6QYR worked on his computer with the Shera locking equipment; Howard W6YGB had some tube problems with his 1296 amplifier; Kerry, N6IZW repaired a spectrum analyzer and has had 15 mile IR Laser contacts non-line of sight, even rain scatter; Ed, W6OYJ went to MUD planning meeting looking at building for the antenna range; Doug, K6JEY did some 7289 tube testing; Bob, WA6VHS did some tripod work; Pat, N6RMJ has 2304 MHz rig working better; Dennis, WA6NIA went on OVRO trip; John KJ6HZ broke his IF radio; Scott, WA6MMF has been working with High Speed Multi Media radio; Wayne, KH6WZ got his 10 GHz radio working; Larry , KG6EG is gathering parts; Chip, N6CA is buying tripods off ebay, getting the rig ready to ship to Paul KH6HME this summer; Ken. W6DTA had environmental problems with the rain; KC6DYD is buying tripods of ebay; Dick, K6HIJ is building feeds for OVRO; Chuck, K6PIP has some working Gunnplexers; Gary, K6KVC had rain coming into the shack via the inside of coaxial cables.

### **"Wants and Gots for sale"**

Want: 1w 10 GHz PA Chris N9RIN 949-388-3121

### **MICROWAVE UP DATE 2005**

Chairman: Pat Coker, N6RMJ of SBMS

Planning Committee: Pat Coker, N6RMJ of SBMS

David Peters, KI6FF of WSWSS

Dennis Kidder, WA6NIA of SBMS

Presentations: Chip Angle, N6CA

Publicity: Wayne, KH6WZ

PRIZES: Dave Glawson, WA6CGR

Registration & Finance: Dick Kolbly, K6HIJ

Family Program: Mel's wife&mdash;need name

Surplus Tour: Mel, WA6JBD

Location: Sheraton Cerritos Town Center

List of Presentations:

SBMS 50 YEARS Dick Kolbly, K6HIJ

Pat, N6RMJ signed at contract with the Cerritos Hotel. Mel, WA6JBD will be collecting surplus store information for the junk run. The SBMS web site has MUD 2005 subsite. SBMS will be allowed use of the hotel roof for signal sources for the antenna-measuring event. Room rates were discussed at the \$99 level.

Pat is working on getting a link set up on line to do hotel reservations. Chip has some 12 speakers on line for presentations. David, KI6FF is working transportation issues. Ken is figuring out the tee shirt and hat designs. Mel is working on adding to his list of surplus stores for the tour. Mel's wife is going to be leading the spouses program.

### **Microwave Up Date 2005 Call for Papers**

MUD 2005 will be held this year in the Los Angeles area on October 27 thru the 31st. As the Technical Program Chairman this year, I would like to invite interested authors to present a paper(s) for the 2005 conference.

Microwave Update is the premiere microwave amateur radio conference on the planet. Many people around the world collect the proceedings from this conference since it represents the current state of the art in microwave amateur radio. This is a great opportunity to get your ideas and papers published! You don't have to give a talk to get your paper included in the proceedings.

Electronic submissions in Word, WordPerfect or text format accepted by email or CD. Usual drawing formats also accepted with your paper(s).

Cutoff date for inclusion in the proceedings is September 5th, 2005. If you are interested in writing and/or presenting a paper for the 2005Conference, please send me an email or write to:

N6CA PO Box 35 Lomita CA 90717-0035 email: n6ca@ham-radio.com

Please contact me as soon as possible with an abstract or even a general idea. This will help the conference team with its planning activities. For more information about the Microwave UpDate 2005 see:  
<http://www.microwaveupdate.org>

73 Chip N6CA

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The auction by "Square Deal Doug" again brought in more monies to the Auxiliary fund- All mode 10 meter radio HR2600, 2003 RSGB microwave projects book, 47 GHz LO, mixers, wire, boxes of stuff, 0-20v 0-50a switcher power supply, some HTs, and an HP 141T scope were among the items going for gain of the society.  
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### Owens Valley Radio Observatory Project

The OVRO SBMS Project Update&mdash;Dennis, WA6NIA and Chuck, WA6EXV visited the site to take measurements and see how things were placed. Mark Hodges of the OVRO took them around the site and out on to the feed of the 40-meter dish. This facility has become the "class room" for the Education part of the observatory staff. Tasks needing work are a survey of the many coaxes running to the feed, documenting the lay out of the box to go at the feed, and planning the events. It is hoped that there will be a quarterly operation for both the world amateur EME people and high school student around the world. There is a phone line from the feed to the control room. There is also Internet capability from the control room to help schedule operations others beyond the site. The dish at 10 GHz is 1 arc second wide&mdash;a problem with past ENME experiments. The moon is 30 arc seconds wide. A moon map" is available and the dish is controllable to within that arc second during the tracking and communication experiments. Both 1296 MHz and 10 GHz experiments are being planned. Two college professors have signed on with the OVRO SBMS project to use our system as part or their instruction. They are quite excited and have several ideas for projects using EME. More later. Doug K6JEY

### Beacons-

Heaps Peak DM14kf 34.14.2.4n 117.8.25.2w 8kft horz 1296.0-.2 MHz in 2304.6-.8 MHz out

Frazier Mtn DM04ms 8013 ft 10,386.3104 MHz 1.4w 14-dBi-omni horz.

Palos Verde DM03ts 1300 ft 10,368.300 MHz 1.6w 14-dBi-omni horz.

San Diego DM12mq 32.41.8n 116.56.09w 10,368.070 MHz 14 dbm 10db omni horz

Santiago DM13fr 33.42.690n 117.32.020w 5664 ft 10,368.330 MHz 0.5w 10dbi horz

ATV: 2441.5 MHz in 5.9 GHz out 10.368.4 MHz in 3460 MHz out



Chip, N6CA spoke at the March SBMS meeting about how to try to keep the tripod-mounted rig from blowing over in the wind. Chips ideas included making the base feet as far apart as possible to keep the moments large. Using a wind speed vs. dish area one can come up with the pressure the wind will place on the rig. Then using a angle plate like shown on the picture take a bathroom scale and push against the plate with that pressure and see if the tripod goes over. Using the portable battery hanging under the center of the tripod helps give more stability.



Dick, K6HIJ spoke on the ideal IF radio characteristics that one would like to have when using microwave transverter. His talk is included in this issue.

### The "Ultimate" IF Rig - Some Thoughts

Dick Kolbly K6HIJ

When we build our microwave station, rarely do we give much thought to the intermediate-frequency receiver and exciter until the last stages. Most of us use an existing VHF or UHF transceiver and live with the shortcomings. Having both operated home and mobile microwave stations and using existing high-frequency radios for exciters and IF receivers, I have never found the equipment I used to be completely satisfactory for what I was trying to accomplish.

The purpose of this discourse is an attempt to define what the "ultimate" exciter/IF radio would be like. No attempt has been made to fit these "requirements" to any existing equipment, only to provoke discussion and

design.

Following are some specifications, based on discussions and some experience:

Receiver Section:

Tuning Range: 29 - 31 MHz. (Transverters could be used to extend the range)

Operating Modes:

Wide-band FM (+/- 50 KHz)

Narrow-band FM (+/- 2.5 KHz)

Single-sideband (2.1 KHz)

CW (Adjustable bandwidth, down to 100 Hz or less)

DSP/Digital Modes

Sensitivity: Not Critical - this is set by the microwave equipment.

Spurious Signals/Birdies: <-10 dB below noise floor.

Dynamic Range:

Frequency Display: 100 Hz resolution, usable under a wide range of illumination.

Frequency Stability: <10 Hz, with provision for external reference input

Exciter Section:

Tuning Range: 29-31 MHz

Signal Modes:

Wide-band FM

Narrow-band FM

Single Sideband (Upper/lower)

CW

Digital modes (JT31, WSJT, etc)

Power output: 20 mW (+13 dBm, all modes)

Some general comments:

Bill of Materials (BOM) Cost: <\$300.00

Many features of this proposed rig are incorporated in the current TAPR DSP-10 receiver/exciter. The frequency range of the DSP-10 is the 2-meter band, which is also a good range for an IF receiver/exciter. The wide band modes could be incorporated as a separate IF strip.

The DSP-10 has the disadvantage that it requires a computer for operation. Also, my opinion is that the unit should "operate like a ham rig", with knobs for tuning, volume, bandwidth, etc. and "normal" buttons and switches. It may be possible to develop a "front panel" type of interface for the DSP-10.

Some features that could easily be incorporated into the design include:

A display offset mode so that the receiver displays that actual microwave frequency received.

Built-in push-to-talk and a sequencer to operate microwave relays, power amplifiers, etc.

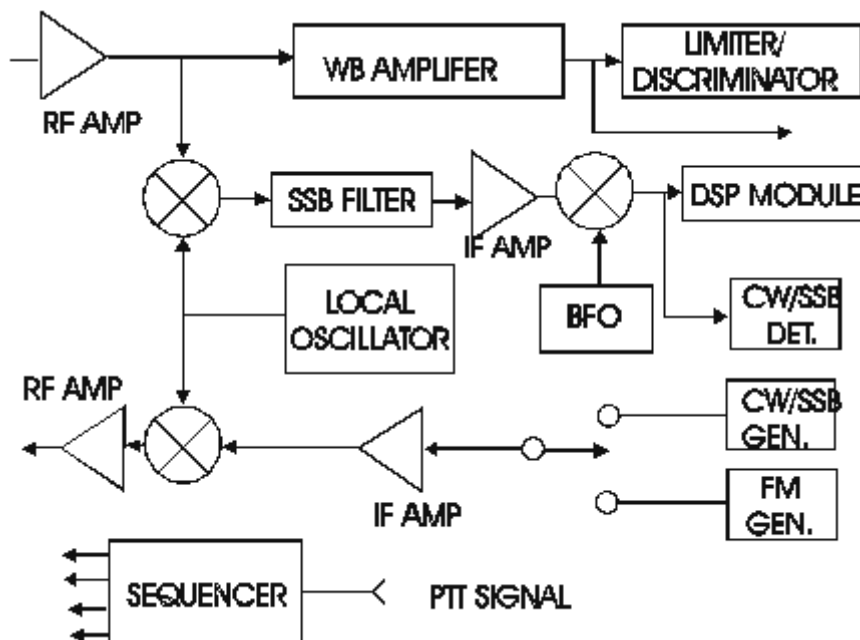
A linear noise-power output for noise figure, Y-factor, and astronomical measurements. This could incorporate a log scale detector for dB measurements.

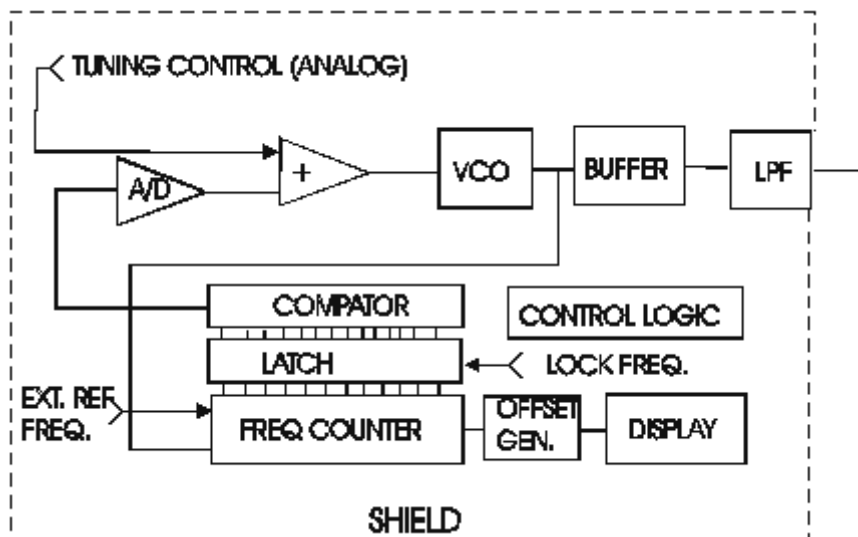
Flash memory to hold setup information, such as frequency offsets, sequencer delays, etc.

A few thoughts on the local oscillator: The local oscillator is a key component in any receiver. It must meet the stability requirements, and be free from excessive noise and spurious signals. If we intend to have narrow band reception, the stability must be within the bandwidth requirements.

The "modern" choice is a synthesizer. Although it should be fairly simple to make a synthesizer that will move in 100 Hz increments, the problem of rapid versus slow tuning poses some difficulties. My proposal is that we use a tunable oscillator with a frequency counter as a display. The counter display section could easily incorporate logic to allow locking the frequency to a predetermined value. By using an oscillator with a low harmonic content and carefully filtering the output, spurious responses could be readily controlled. On the other hand, elimination of sidebands from a synthesizer requires careful design.

Any IF device should be very well shielded. The unit will be operating in the presence of a number of signal sources, and if it is used for portable operation, often it will be required to function in the vicinity of strong RF emitters, such as are found on mountaintops.





## Local Oscillator

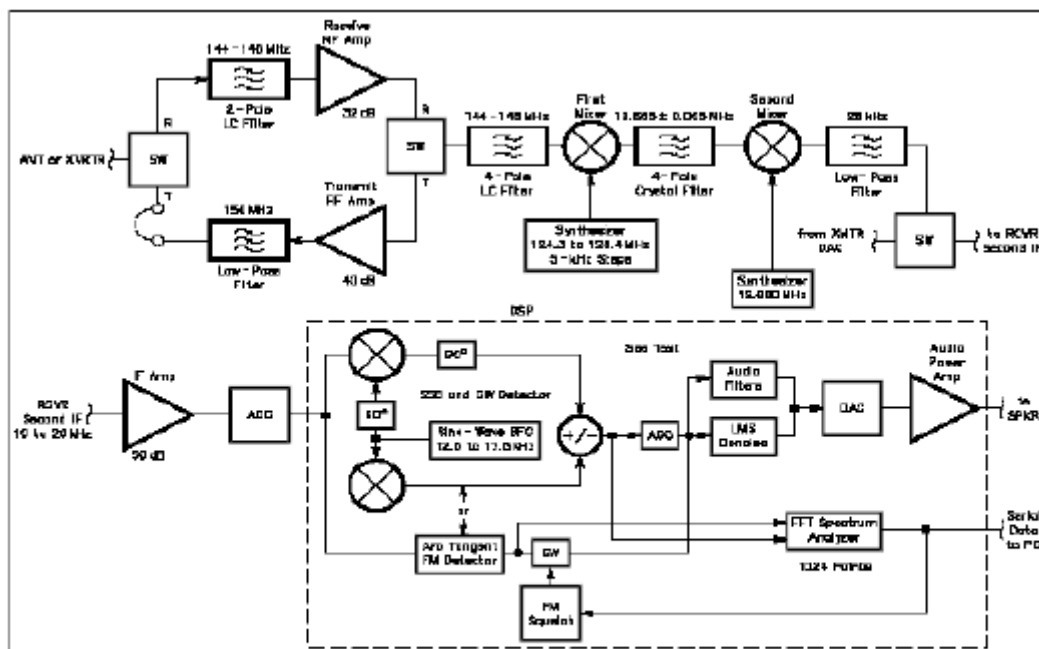


Figure 1—This transceiver block diagram shows the receive path and the hardware portions of the transmit path. Most of the circuits are bidirectional, being used for transmit and receive. The dashed line at the output of the 150-MHz low-pass filter indicates the signal path to the TR switch during transmit. Two frequency conversions shift the signal from 146 MHz down to the 15-kHz IF. All IF and audio processing is done using DSP. One detector is used for SSB or CW and a second detector for FM. Fine tuning for the SSB/CW modes comes from the 12.5- to 17.5-kHz software BFO.

The DSP-10 Receiver/Exciter (From QST September 1999, The DSP-10: An All-Mode 2-meter transceiver Using a DSP IF and PC-Controlled Front Panel, Bob Larkin, W7PUA)

73's Bill

Here is a list of planned programs for SBMS for the year. Please send a copy or email a copy to anyone who you think would be interested in coming. We would like to have the list posted in as many appropriate places as possible, including our website.

The San Bernardino Microwave Society always meets on the first Thursday of the month at the Legion Hall in Corona, Ca. at 7pm. We usually meet about 4pm for dinner at Furr's restaurant located on the North side of the Lincoln off ramp of the 91 freeway. The legion hall is at 1024 Main St. For further information call Doug Millar K6JEY at 562 424 3737 or contact any SBMS member. Our web site is at <http://www.ham-radio.com/sbms/>.



## Up-coming meetings 2005-2006

April- Paul Chominski WA6PY on EME personal history and current projects. Paul's story is interesting and he has a lot of experience on 10GHz and 23cm EME, as well as building high power amplifiers

May- Frank and maybe Dennis on hand held 10GHz radios. Miniature 10 GHz receiver designs.

June- Noise Figure Measurement Clinic. Bring your preamps and transverters to get their NF measured. 24GHz and below. Power Measurement available as well up to 78GHz. Call for special power levels and frequencies above 100mw.

July- 76GHz equipment progress Kerry Banke K6IZW. We have had some exciting developments. "Banke Labs" has been hard at work modifying some surplus equipment.

August- Contest preparation and places. Find out where people are going during the 10ghz and up contest, get information on locations and maybe form a team.

September- Contest prep, Owens Valley project update and prep, and Microwave Update rep. Lots to do for September and October

October- Microwave Update preparation.

November- Microwave Company rep on latest microwave developments we will have someone in from industry to talk about the latest developments. Door prizes!

December- Christmas Party at The Lab and Gift Exchange

Meeting- History of Radio Astronomy- We hope to have a guest speaker.

January 2006- OVRO-SBMS Update and Report. Details of the Owens Valley Radio Observatory project with pictures and sound.

February. - 1296Mhz High Power Amplifiers. Members will share their projects and results. Want to build an amp? Join us for a presentation by those who have had experience building them. Both solid state and Tubes.

Please check on the website if there have been any changes. We will keep you posted there and in the newsletter.

Also-

Each month after the program we will have the Auxiliary fund Auction. Bring your stuff and mark it as

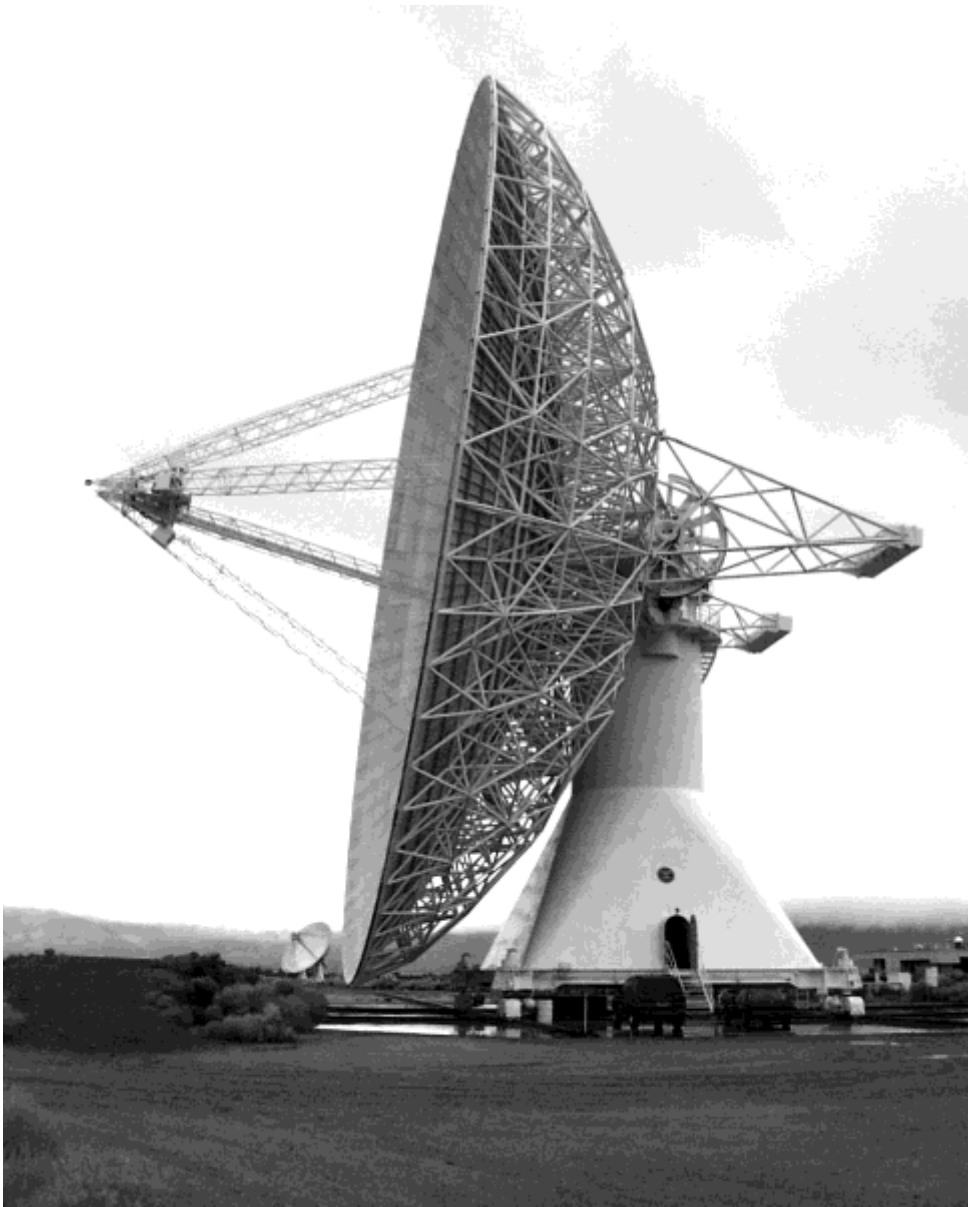
Category 1 All proceeds go to the club

Category 2 Same but with a starting minimum

Category 3 Part goes to club and part to owner.

Thanks,

Square Deal Doug K6JEY



The Owens Valley Radio Observatory facility that SBMS will be helping generate EME signals from. Photo WA6NIA



Dennis, WA6NIA out on Secret Site 51 during the 2004 ARRL 10 GHz and Up contest with his 10 GHz rig. Behind him is the 24 GHz rig.

he San Bernardino Microwave Society is a technical amateur radio club affiliated with the ARRL having a membership of over 90 amateurs from Hawaii and Alaska to the east coast and beyond. Dues are \$15 per year, which includes a badge and monthly newsletter. Your mail label indicates your call followed by when your dues are due. Dues can be sent to the treasurer as listed under the banner on the front page. If you have material you

would like in the newsletter please send it to Bill WA6QYR at 247 Rebel Road Ridgecrest, CA 93555, [bburns@ridgecrest.ca.us](mailto:bburns@ridgecrest.ca.us), or phone 760-375-8566. The newsletter is generated about the 15th of the month and put into the mail at least the week prior to the meeting. This is your newsletter. SBMS Newsletter material can be copied as long as SBMS is identified as source.

San Bernardino Microwave Society newsletter

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USA